Remarks

Claim 10 has been objected to for use of "n", rather than –an- -. The referenced location in the claim has been corrected.

Claims 1, 2 and 4-13 have been rejected as being obvious and unpatentable over Ponsot '538 in view of Konolige '207 (published application) and the Fair et al article. Claim 3 has been rejected as being unpatentable over Ponsot '538 in view of Konolige '207 in further view of the Fair article and Ahl '464. Responsive to the rejections, Applicants have amended independent claims 1, 10, and 12 to more clearly recite the nature of the invention and distinguish it from the references.

In particular, the claims now specifically recite that the model based staircase pose estimator utilizes the grouping of line features by the use of geometric invariants, and that the differences in the image pair are determined by measuring pixel differences between unwarped and warped images, wherein the image differences are represented in an image pyramid. The methodology is discussed at page 8 of the specification.

As now claimed, obstacle detection is performed by warping a first image, such as the left image, to the other (right) image and perform a comparison. Objects on the staircase, which should be detected, are closer to the camera than the staircase on which they are placed. Therefore, such objects in the image being warped will appear at different positions from those in the unwarped image. On the other hand, disturbances such as dirt and the like on the staircase appear in much the same position in the warped and unwarped images.

Ponsot '538 discloses a monitoring system for the detection of obstacles and persons utilizing a video camera. The system does not acquire stereoscopic images. While Konolige '207 discloses a real time stereo motion analysis system, stated as being suited for robotic vehicles, it does not employ any model based staircase pose estimator. Further, the acquired stereoscopic images and determined differences in an image pair are **not** segmented into a background or foreground, much less an escalator background and an obstacles (and persons) foreground. Indeed, in the case of robotic vehicles no fixed background exists.

The Fair article is directed to a stair climbing robot which is capable of detecting the top and bottom of a staircase. No discussion of image differences is discussed; the system searches for staircase presence characteristics, such as a riser, using laser ranging (not stereoscopic images) for distance calculations to locate and define the staircase element. Image differences, much less differences in an image pyramid, are not utilized. The robot need only recognize the top and bottom of the staircase, and no obstacles are intended to be present on the staircase. Fair does not use, or suggest, pose estimation, but uses ranging data and the robot's pitch/orientation data to operate.

While the Hsu article has not specifically been cited, it is to be pointed out that the article describes cameras for robotic vehicles, but provides no specific algorithm in which image differences are represented in an image pyramid and segmented into a background and foreground.

It is respectfully submitted that one skilled in the art desiring to distinguish persons from background changes, such as the presence of dust or debris, on an escalator would not be led by the references of record to introduce any real time stereo or motion analysis of the type set forth in Konolige '207 or in the Fair article into the monitoring system of Ponsot '538. Notwithstanding the further differences between the invention as now claimed and the total teachings of the references, the algorithms of Konolige '207 and the Fair article provide no hint nor solution to the specific problem addressed and solved by the present invention. Other than hindsight provided by the present invention, the references themselves offer no reason by which the Konolige and Fair references would or could be applied to the system of Ponsot '538.

While the Examiner takes the position that an order for the Konolige method to compute sub-pixel mapping, it would necessitate comparison and determining differences of the rectified image, such a conclusion, to the extent justifiable, does not further carry to the specific methodology employed and now claimed in the present invention, whereby the image differences are represented in an image pyramid. The assumptions made by the Examiner cannot be extrapolated to such an extent to suggest applicants' specific methodology.

Withdrawal of the rejections and passage to allowance is solicited.

Respectfully submitted,

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CERTIFICATE UNDER 37 C.F.R. 1.8(a)

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on February 27, 2008

Carol L. Wood _____